

AUTOMATED MAINTENANCE OF AN ELECTRONIC DEVICE

TECHNICAL FIELD

[0001] The embodiments disclosed herein relate to the field of portable electronic devices. More particularly, the embodiments relate to performing maintenance and repair services on portable electronic devices. In still greater particularity, the embodiments relate to performing maintenance or repair services on a portable electronic device during device down-time or when the device is in an environment where a user would not detect that the services are being performed and at a time unknown to a user.

BACKGROUND

[0002] Portable electronic devices such as smartphones, tablets, laptop computers and the like have become ubiquitous in recent years. Because users have grown accustomed to carrying these devices and relying on them for timekeeping, location, information, internet access and many other uses, users carry these devices in many environments and during most time periods of the day. Users carry these devices while travelling in automobiles, on buses, trains, and on airplanes and while engaging in strenuous activities such as running, climbing and the like as well as during other less strenuous activities. Because users are in possession of these devices in many environments, these devices may sometimes be exposed to environmental elements such as water, wind, dust and electromagnetic interference events which can alter the performance of certain components of the device.

[0003] Many modern portable electronic devices incorporate various sensor devices such as an accelerometer and gyrometer into the portable electronic device to detect speed and direction of movement. Other sensor devices such as light sensors, proximity sensors and optical sensors for detecting position and various other purposes are included in these devices. These sensors are useful to enhance various functionalities of the portable electronic device. For example, an accelerometer is a device that can measure the force of acceleration, whether caused by gravity or by movement. Because an accelerometer senses movement and gravity, it is increasingly being incorporated into personal electronic devices to detect the orientation of the device, for example, a display screen. This allows the portable electronic device to automatically adjust the visual output to make it appropriate to the direction of the screen to allow for landscape and portrait view on a screen. In this way, a user can view lists with the screen held vertically and watch videos with the screen held sideways. Gyrometers may be included to assist in the determination by accelerometers.

[0004] Because of the increasing amount of services and applications demanded by users of portable electronic devices the types and sophistication of the sensing elements contained therein is increasing. By subjecting the portable electronic devices to shock and environmental conditions such as those described above, users risk damage to the components in these devices. Such damage can result in poor or no performance of the portable electronic device. Exposure to environmental elements may take its toll on the portable electronic devices which necessitates increased maintenance, recalibration and repair services to the portable electronic devices. This increase in service requirements can become an annoyance to a user of the portable electronic device and can

result in significant user dissatisfaction. These maintenance and repair services may be time consuming to perform and result in unavailability of certain services and user down time which may be unacceptable to many users who rely on these devices during, and as part of, their daily routines and activities.

SUMMARY

[0005] Generally, embodiments described herein disclose systems and methods for performing maintenance and other services on a portable electronic device. The portable electronic device includes various sensors which may provide information on the status of the portable electronic device. That is, the sensors may detect whether the device is in use or is in an environment where services may be performed without detection by a user or without inconvenience to that user. If a maintenance situation is identified, the maintenance or other repair may be performed without interrupting the user's normal routine. That is, the maintenance services may be performed if the device determines that it is not being used such as when the user is sleeping or is engaged in other activities which would make the user unaware that such maintenance or remedial operations are being performed. In another embodiment, the device is determined to be in an environment (noisy, low light, and so on) which would make it optimal for performing certain services without disruption to, or detection by, a user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a perspective view of a portable electronic device;
[0007] FIG. 2 is a perspective view of a portable electronic device held by a user;
[0008] FIG. 3 is a view of a portable electronic device in a noisy environment;
[0009] FIG. 4 is a view of a portable electronic device shown while a user is sleeping;
[0010] FIG. 5 is a flow chart of one method for performing maintenance; and
[0011] FIG. 6 is a flow chart of another method for performing maintenance.

DETAILED DESCRIPTION

[0012] Referring to the figures wherein like reference numbers denote like structure throughout the specification, FIG. 1 is a perspective view of an electronic device such as a smartphone 11 is shown. Smartphone 11 includes a housing 12 to contain various electronic components including a display screen 13 which may be a touchscreen used to display images. In addition, housing 12 includes various controls and features such as a home button 14 and a speaker 15 as well as camera activation button 16 and an on/off button 19. Home button 14 may be used to sense user contact and sense a fingerprint of the user so as to provide identity verification. Other controls not shown include volume adjustment, microphone and camera controls including flash and shutter mechanism as are known in the art may be included on the sides or backside of housing 12 and are not shown in this view of smartphone 11. Icons for accessing and using various applications (apps) and dialing telephone numbers etc. may be displayed on touchscreen 13.

[0013] A control device 17 in housing 12 may execute instructions and carry out operations associated with portable